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F4H

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(54) Refrigerators

(57) The invention relates to a method of reducing the formation of frozen condensate on a refrigerated surface comprising the step of covering at least part of a refrigerated surface such as a wall or walls of a refrigerator or freezer with a moisture absorbent substance. By absorbing the moisture in the atmosphere surrounding the refrigerated surface, the condensation and freezing of the condensate on the refrigerated surface is prevented. In one form of the invention a structure is provided to support a moisture absorbent substance such as crystals of silica gel (17), the support structure comprising a plurality of containers (16) for the silica gel connected to one another by generally open webs. The structure is rendered self supporting by a framework of wires. Alternatively, a single container (100) comprising bent expanded metal sheets, for instance, may be used to contain the moisture absorbent substance.

Fig 1

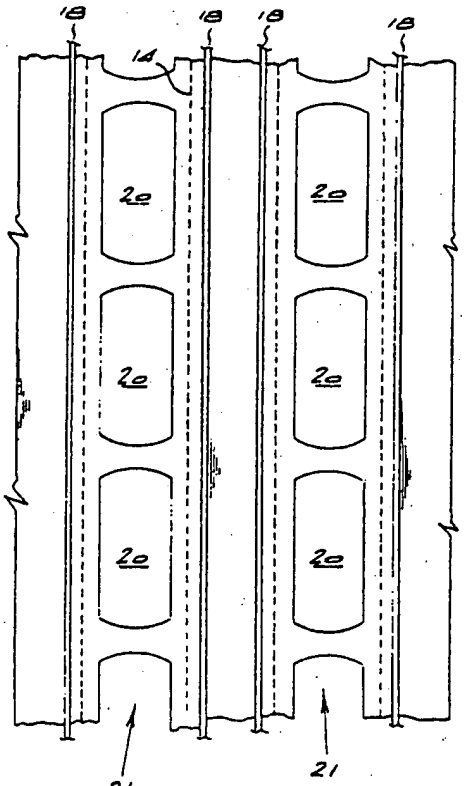

Fig 2

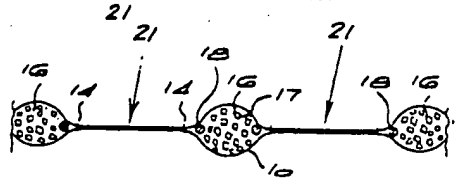

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Fig 1

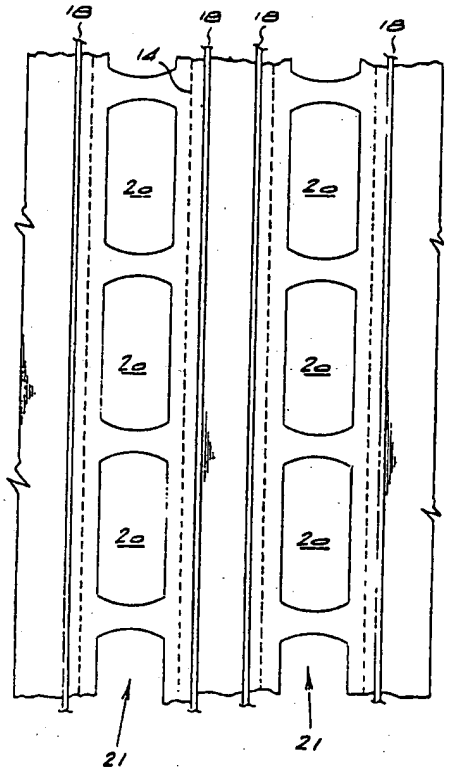


Fig 2

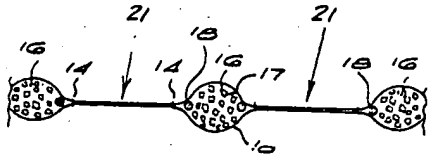


Fig 3

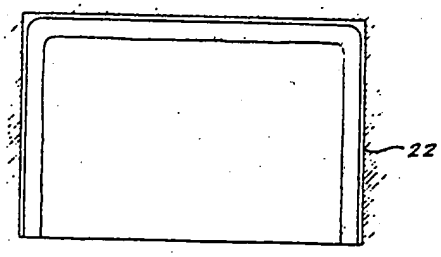
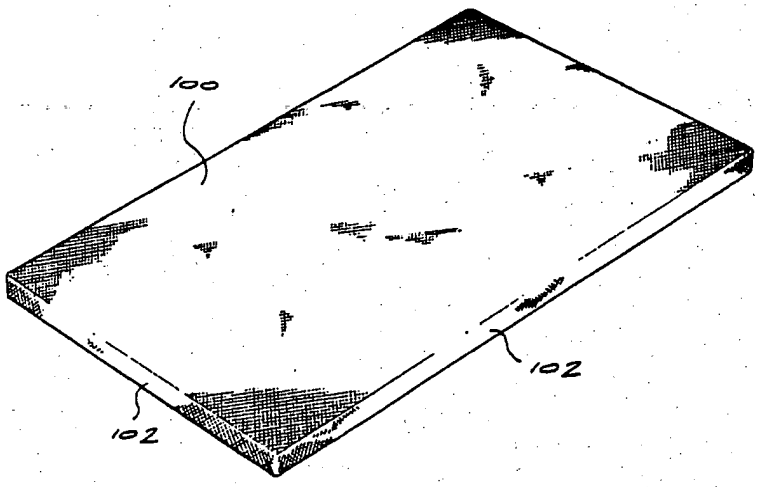


FIG 4



SPECIFICATION

Refrigerators

BACKGROUND TO THE INVENTION

THIS invention relates to refrigeration apparatus and in particular to means and a method for preventing or reducing frosting-up or the build-up of ice in freezers or refrigerators.

SUMMARY OF THE INVENTION

According to the invention a method of reducing the formation of frozen condensate on a refrigerated surface comprises the steps of covering at least part of the refrigerated surface with a moisture absorbing substance adapted to absorb moisture from the atmosphere surrounding the refrigerated surface.

By absorbing the moisture or water vapour in the vicinity of the moisture absorbing substance, the build-up of frozen condensate, such as ice or frost in a commercial or domestic refrigerator or freezer, will be countered.

The refrigerated surfaces of a refrigerator or freezer are normally those surfaces in or below which a refrigerant is circulated in order to effect a heat loss in the atmosphere surrounding the refrigerated surface such as the refrigerated space within the refrigerator or freezer.

The method may include the steps of prepacking the moisture absorbent substance in a container or other support structure and placing the support structure adjacent the refrigerated surface.

The method is preferably carried out using a heat reversible solid moisture absorbent substance, such as silica gel, in which the moisture absorbed by the substance can be driven off by heating and the method may therefore conveniently include removing the moisture absorbent substance or the container or support structure from time to time, heating the substance to dessicate it and relocating the substance or container on the refrigerated surface.

Solid moisture absorbent substances generally have a low thermal conductivity. In addition a substantial amount of static and therefore insulative air is trapped between the particles or crystals of the moisture absorbent substance and this, combined with the low thermal conductivity of the substance will reduce the efficiency of the refigerated surface considerably. For this reason a compromise has to be struck between total cover of the refrigerated surface with maximum moisture absorbency and poor refrigeration and the opposite situation in which a minimum of the surface is covered to give good refrigeration and poor moisture removal.

The invention includes a support structure for a moisture absorbent substance comprising one or more moisture penetrable containers for the moisture absorbent substance, the structure being self-supported and adapted to conform to the contours of a refrigerated surface such as a wall or walls of a freezer compartment in a freezer or a refrigerator.

The support structure may be of any suitable material including plastics, ceramic or metal materials.

The support structure may include a single container comprising at least two foraminous sheets between which the moisture absorbent substance may be retained, the interior of the container being ventilated through the holes in the sheets.

The single container may be sub-divided into spaced apart compartments within which the moisture absorbent substance may be retained, the compartments being ventilated.

The sheets may be sufficiently rigid to support the structure or, alternatively, one or both of the sheets may incorporate framework members adapted to support the structure.

In certain applications, it may be convenient to use a plurality of containers for the moisture absorbent substance, the containers being of a woven, moisture penetrable fabric and separated from one another by generally open webs.

The containers may be constituted by tubular pockets sewn into the fabric and may extend uni-directionally parallel to one another or criss-cross one another in an open lattice structure.

The support structure may have supportive framework members of metal plastics or ceramics, for instance, incorporated therein.

DESCRIPTION OF THE DRAWINGS

The invention will be further described with reference to the accompanying drawings in which:

Figure 1 is a plan view of part of a support structure according to the invention;

Figure 2 is a sectional side elevation of part of a completed support structure as shown in Figure 1;

Figure 3 is a side elevation of the support structure of Figures 1 and 2 in position in a refrigerated compartment and;

Figure 4 is an isometric view of a further embodiment of the invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

Referring to Figures 1 and 2, a support structure for a moisture absorbent substance comprises two layers 10 and 12 of a woven, moisture penetrable fabric stitched together along seams 14 to form compartments 16 which are filled with crystals of silica gel as a moisture absorbent material. The structure is rendered self-supporting by stiffening wires 18 constituting framework members. The wires 18 are incorporated in the compartments 16 as can be seen from Figure 2.

The sections of fabric between the compartments are provided with relatively large apertures 20 to form open webs 21.

In Figure 3 it can be seen how the support structure is fitted into a freezer compartment 22, the wires 18 being bent to the required shape at the corners of the compartment 22. The wires 18 support the compartments 16 adjacent or against the refrigerated surfaces of the compartment 22.

The silica gel in the support structure prevents or substantially reduces any tendency towards ice forming on the refrigerated surfaces of the compartment 22 by absorbing any water vapour in the atmosphere adjacent the refrigerated surfaces.

The structure retains the silica gel close to the refrigerated surface so that the gel is cooled to a temperature approximating the lowest temperature within the compartment. This is important since silica gel, like other heat reversible absorbents, shows an increase in efficiency the colder it becomes. Heating, of course, results in a decreased absorption efficiency to such an extent that, when heated, moisture is lost to the atmosphere surrounding the heated absorbent. Indicator chemicals may be included in the silica gel to indicate a saturated or unsaturated condition.

In a normal commercial or domestic refrigerator, a relatively large quantity of silica gel is required to provide an effective medium for moisture absorption and it is therefore preferable that the silica gel is well dispersed across the refrigerated surface. The silica gel crystals 17 are loosely packed within the compartments 16 and the use of the tubular compartments 16 allows an advantageous distribution of the gel across the refrigerated surface.

Figures 1 and 2 show an example of a support structure in which the compartments 16 are constituted by tubular, unidirectional and parallel pockets extending along the structure. However, it is also possible to arrange the compartments differently, such as, for instance, in a criss-crossing lattice structure, depending on the degree of surface covering that is desired.

For domestic and commercial refrigerators, it is desirable to have the apertures 20 in the webs 21 occupying approximately 40% of the total surface area of the support structure. However, depending on the pocket configuration which is used, it is possible to vary this percentage at will

Instead of a fabric support structure, it is possible to use perforated plates or sheets of metal of plastics sealed at their edges to define a container for the moisture abosrbent substance. Such a support structure or container 100 is shown in Figure 4.

The container 100 comprises at least upper and lower sheets of enamel coated expanded metal mesh bent to define vertical edges 102 which are secured together to enclose an internal space within which the silica gel is contained. It will be appreciated that any foraminous sheet material of, for instance, plastics or ceramic material, may be used. The only requirement is that the material must be able to withstand the temperatures of the environments within which the container 100 is to be used.

If required, the ventilation characteristics of the container 100 can be altered by sub-dividing the interior of the container into compartments in which the moisture absorbent substance is retained with the areas between compartments having larger perforations than the areas defining the compartments in order for the areas between compartments to constitute, in effect, web areas.

Alternatively, fabric packages containing the moisture absorbent substance may be disposed within the container 100 which, in this case, may be formed with relatively large perforations compared to the size of the crystals of the moisture absorbent substance.

CLAIMS

1. A method of reducing the formation of frozen condensate on a refrigerated surface comprises the steps of covering at least part of the refrigerated surface with a moisture absorbent substance to absorb moisture from the atmosphere surrounding the refrigerated surface.

2. A method according to claim 1 including the steps of prepacking the moisture absorbent substance in a support structure and placing the support structure adjacent the refrigerated surface.

3. A method according to either of the preceding claims in which the moisture absorbent substance is a heat reversible solid, the method including the additional step of heating the moisture absorbent substance to drive off absorbed moisture.

4. A support structure for a moisture absorbent substance comprising one or more moisture penetrable containers for the moisture absorbent substance, the structure being self supported and adapted to conform to the contours of a refrigerated surface.

5. A support structure according to claim 4 including a single container comprising at least two foraminous sheets between which the moisture absorbent substance is retained.

6. A support structure according to claim 5 in which the container is sub-divided into spaced apart compartments within which the moisture absorbent substance may be retained, the compartments being ventilated.

7. A support structure according to either of claims 5 or 6 in which the sheets are sufficiently rigid to support the structure.

8. A support structure according the claim 4 including a plurality of containers of a moisture penetrable fabric separated from one another by generally open webs.

9. A support structure according to claim 9 in which the containers are constituted by tubular pockets sewn into the fabric.

10. A support structure according to claim 9 in which the pockets extend uni-directionally parallel to one another.

11. A support structure according to claim 9 in which the pockets extend transversely to one another in an open lattice structure.

12. A support structure according to any one of claims 8 to 11 including framework members adapted to support the structure.

13. A support structure according to claim 12 in which the framework members are of metal wire.

14. A method of reducing the formation of frozen condensate on a refrigerated surface as described in the specification with reference to the accompanying drawings.

15. A support structure for a moisture absorbent substance as described in the specification with reference to the accompanying drawings.

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